

FCC PART 15 B
TEST REPORT

For

Hena Digital Technology (Shenzhen) Co., Ltd.

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FCC ID: M7C-PAD941IW

Report Type: Original Report	Product Type: MID
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Report Number: RDG151026001-00C	
Report Date: 2015-10-30	
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TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
DESCRIPTION OF TEST CONFIGURATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS	5
SUPPORT CABLE LIST AND DETAILS	5
CONFIGURATION OF TEST SETUP	6
SUMMARY OF TEST RESULTS.....	7
FCC§15.107 - CONDUCTED EMISSIONS.....	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP.....	8
EMI TEST RECEIVER SETUP.....	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
CORRECTED AMPLITUDE & MARGIN CALCULATION	9
TEST RESULTS SUMMARY	10
TEST DATA	10
FCC §15.109 - RADIATED SPURIOUS EMISSIONS	13
MEASUREMENT UNCERTAINTY	13
EUT SETUP	13
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE	14
TEST EQUIPMENT LIST AND DETAILS.....	15
CORRECTED AMPLITUDE & MARGIN CALCULATION	15
TEST RESULTS SUMMARY	15
TEST DATA	15
DECLARATION LETTER.....	24

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

TheHena Digital Technology (Shenzhen) Co., Ltd.. 's product, model number: *MI90Q5 (FCC ID: M7C-PAD941IW)* (the "EUT") in this report was a *MID*, which was measured approximately: 23 cm (L) x 13.5cm (W) x 1.1 cm (H), rated input voltage: DC3.7V rechargeable Li-ion battery or DC5V charging from adapter. The highest operating is 1.88 GHz.

Adapter information: AC ADAPTER
MODEL:PEF-0500200UA
INPUT: 100-240V~,50/60Hz, 0.3A
OUTPUT: DC5V, 2A

Note: The series product, model MI90Q5, MID90Q5, MI90Q5L, MID90Q5L, MI90Q5S, MID90Q5S, MID90Q5 , MI90Q5*(* can be A-Z),PAD943iW, PAD941iW are electrically identical, the difference between them is model name, we selected MI90Q5 for testing, the details was explained in the attached declaration letter.*

All measurement and test data in this report was gathered from production sample serial number: 151026001 (Assigned by BACL, Dongguan). The EUT was received on 2015-10-27

Objective

This test report is prepared on behalf of *Hena Digital Technology (Shenzhen) Co., Ltd.* in accordance with Part 2, Subpart J, and Part 15-Subparts A and B of the Federal Communications Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 B Class B.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: M7C-PAD941IW
FCC Part 15C DTS submissions with FCC ID: M7C-PAD941IW

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

The software “winthrax.exe” was used during test.

Equipment Modifications

No modification was made to the EUT tested.

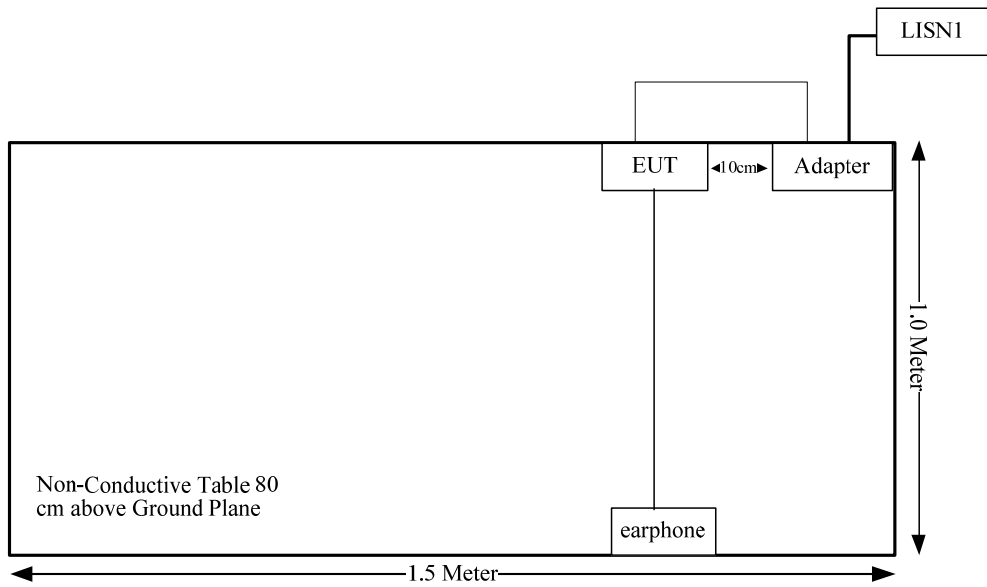
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Kingston	U-disk	8GB	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	no	no	1.0	USB Port of Adapter	EUT
Earphone Cable	no	no	1.0	Audio Port of EUT	EUT

Configuration of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are Receiver, cable loss, and LISN.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cisp} of Table 1, then:

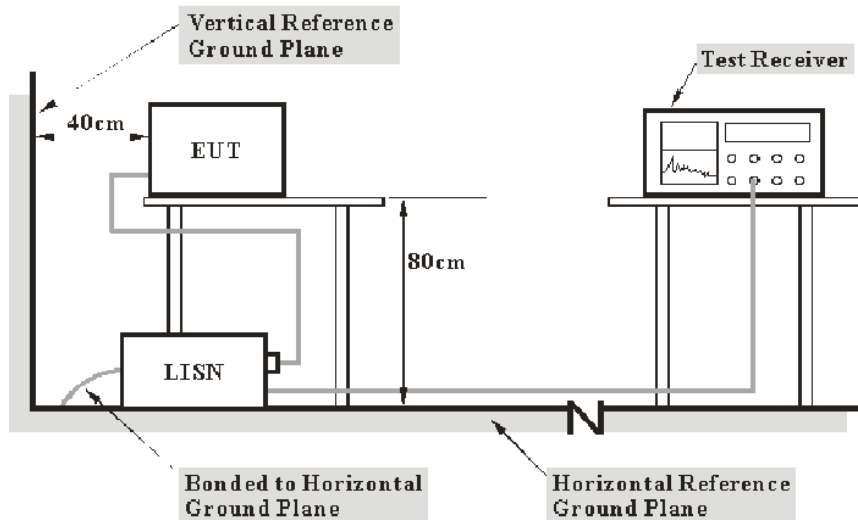
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cisp}

Measurement	U_{cisp}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter of laptop was connected to a 120V/60Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-20	2015-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2015-07-16	2016-07-15
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter of laptop was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

9.2 dB at 0.457684 MHz in the **Line** conducted mode

Test Data

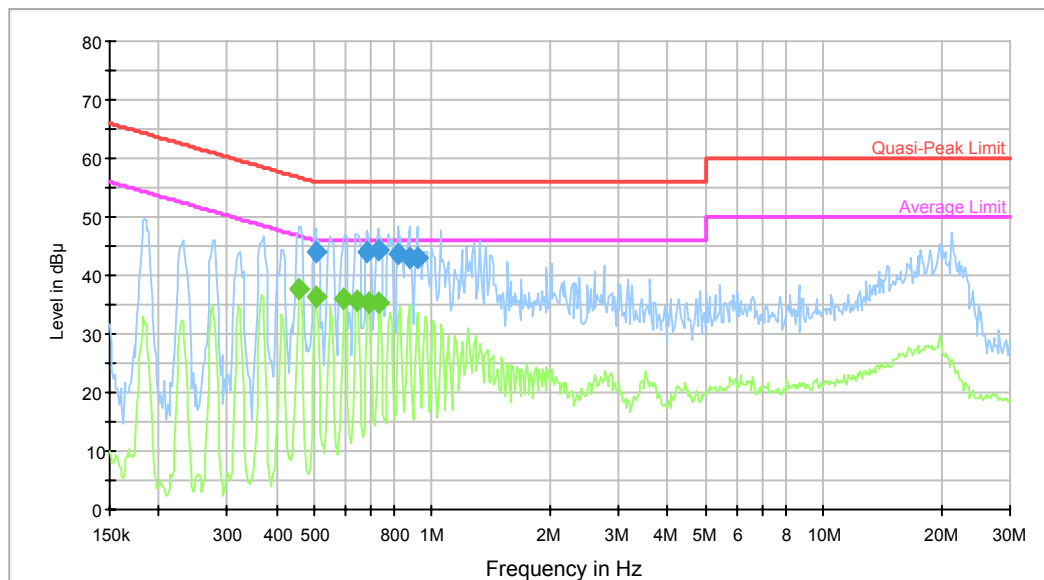
Environmental Conditions

Temperature:	27.4°C
Relative Humidity:	57%
ATM Pressure:	101.1 kPa

The testing was performed by Allen Qiao on 2015-10-28

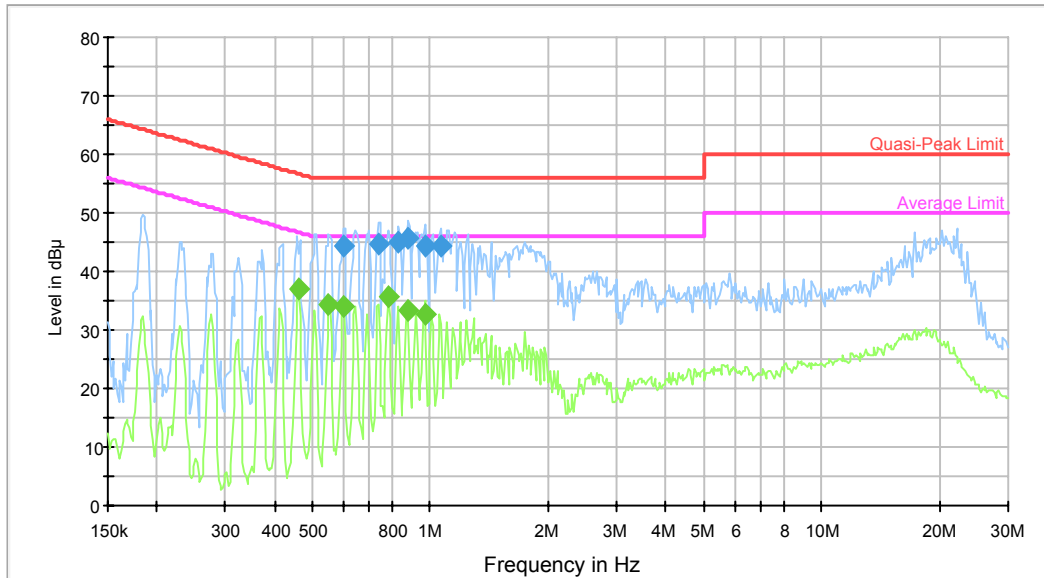
Test Mode: Charging&playing

AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.503608	44.1	9.000	L1	9.8	11.9	56.0	Compliance
0.681699	44.0	9.000	L1	9.8	12.0	56.0	Compliance
0.726569	44.4	9.000	L1	9.8	11.6	56.0	Compliance
0.818813	43.6	9.000	L1	9.8	12.4	56.0	Compliance
0.872708	43.0	9.000	L1	9.8	13.0	56.0	Compliance
0.915445	43.0	9.000	L1	9.8	13.0	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.457684	37.5	9.000	L1	9.8	9.2	46.7	Compliance
0.503608	36.4	9.000	L1	9.8	9.6	46.0	Compliance
0.595338	35.9	9.000	L1	9.8	10.1	46.0	Compliance
0.644717	35.6	9.000	L1	9.8	10.4	46.0	Compliance
0.687153	35.3	9.000	L1	9.8	10.7	46.0	Compliance
0.732382	35.2	9.000	L1	9.8	10.8	46.0	Compliance

AC120V, 60Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.600101	44.4	9.000	N	9.8	11.6	56.0	Compliance
0.738241	44.7	9.000	N	9.8	11.3	56.0	Compliance
0.831967	45.0	9.000	N	9.8	11.0	56.0	Compliance
0.879690	45.6	9.000	N	9.8	10.4	56.0	Compliance
0.967957	44.2	9.000	N	9.8	11.8	56.0	Compliance
1.065081	44.3	9.000	N	9.8	11.7	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.461346	36.9	9.000	N	9.8	9.8	46.7	Compliance
0.549741	34.3	9.000	N	9.8	11.7	46.0	Compliance
0.600101	33.9	9.000	N	9.8	12.1	46.0	Compliance
0.780588	35.5	9.000	N	9.8	10.5	46.0	Compliance
0.872708	33.3	9.000	N	9.8	12.7	46.0	Compliance
0.967957	32.8	9.000	N	9.8	13.2	46.0	Compliance

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit.

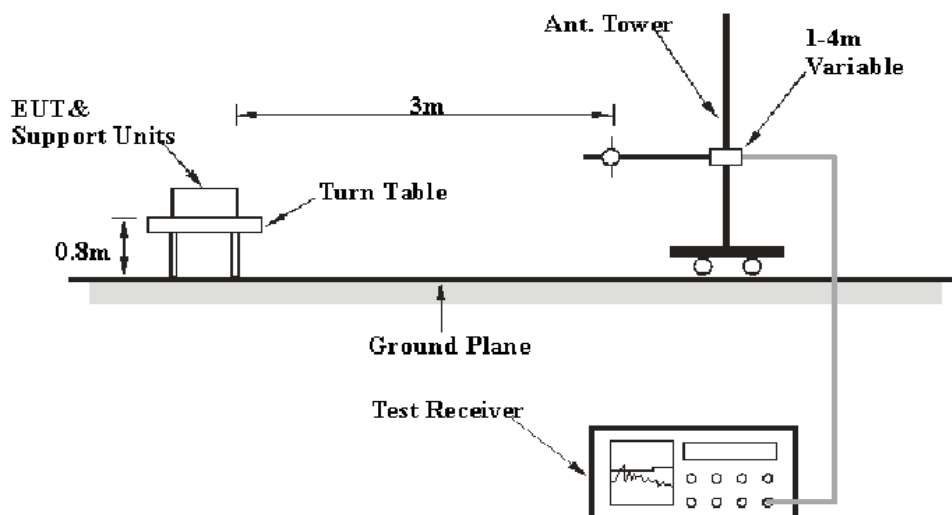
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 30M~200MHz: 5.0 dB; 200M~1GHz: 6.2 dB; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of U_{cisp}

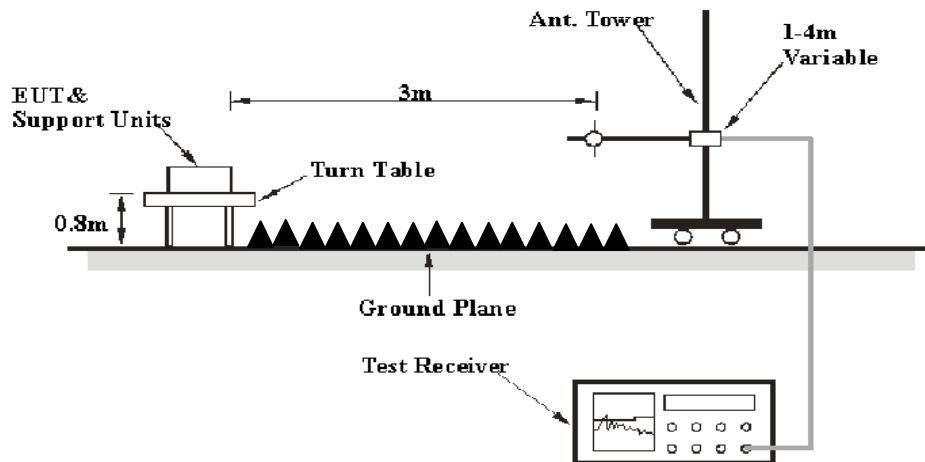
Measurement	U_{cisp}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 10 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2014-12-04	2015-12-04
ETS-Lindgren	Horn Antenna	3115	9808-5557	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

5.4dB at 179.3800 MHz in the Horizontal polarization for test mode 2

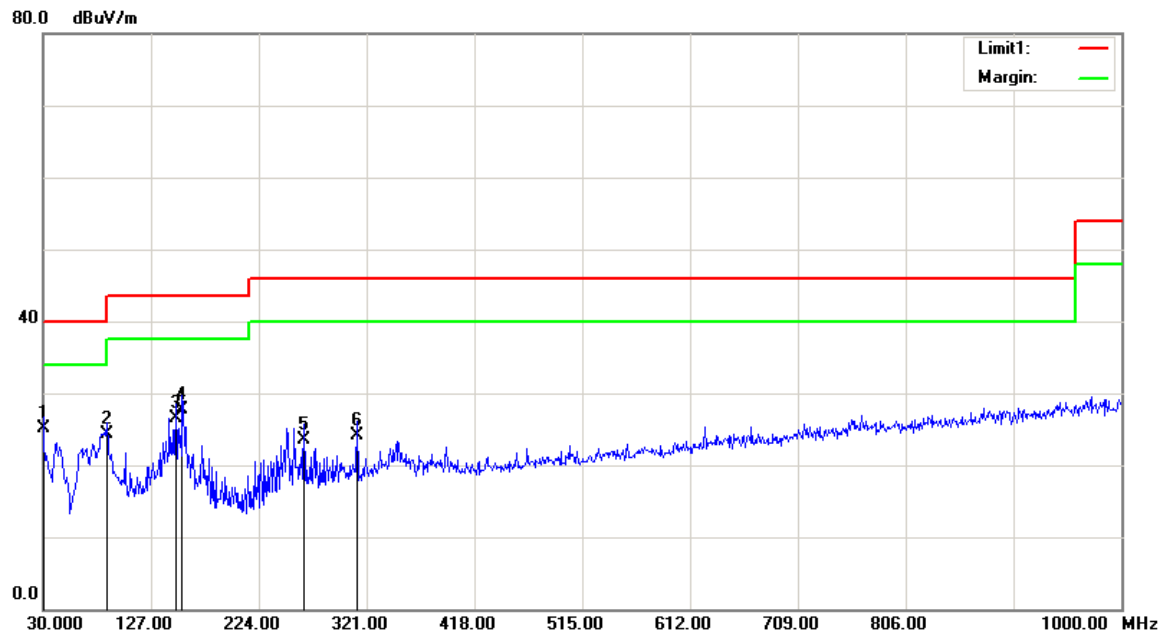
Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	54 %
ATM Pressure:	101.1kPa

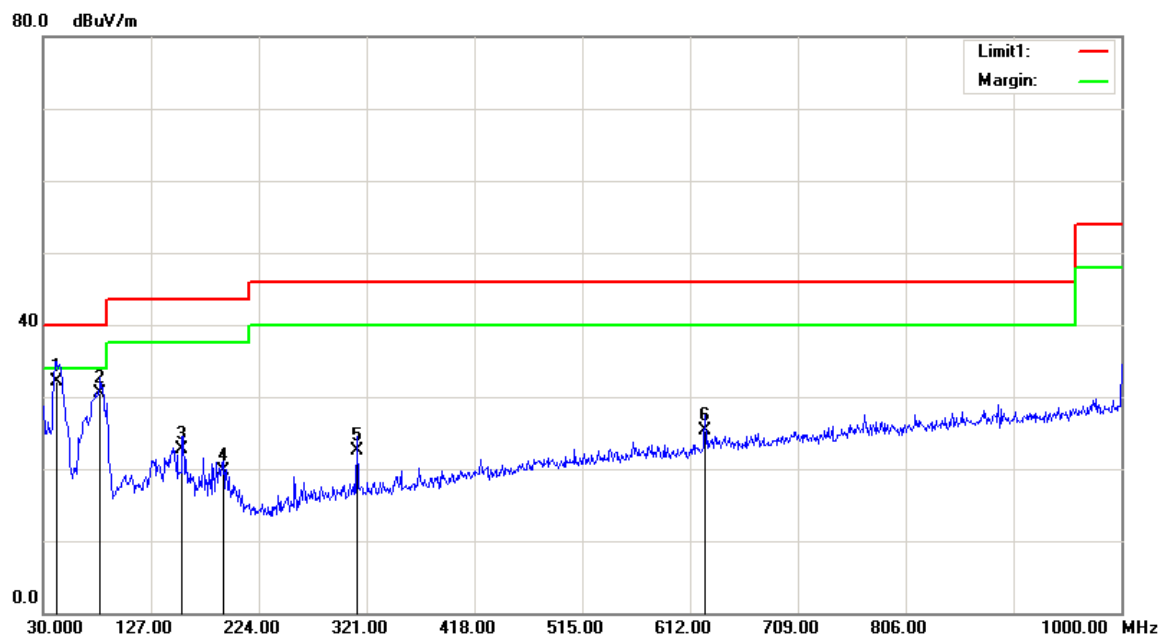
The testing was performed by Allen Qiao on 2015-10-28

Test Result: Compliance

*Test Mode 1: Charging&Playing***1) Below 1GHz:****Horizontal**

Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	24.46	QP	0.74	25.20	40.00	14.80
87.2300	37.01	QP	-12.61	24.40	40.00	15.60
149.3100	34.08	QP	-7.58	26.50	43.50	17.00
155.1300	35.15	QP	-7.45	27.70	43.50	15.80
264.7400	30.20	QP	-6.70	23.50	46.00	22.50
312.2700	29.77	QP	-5.67	24.10	46.00	21.90

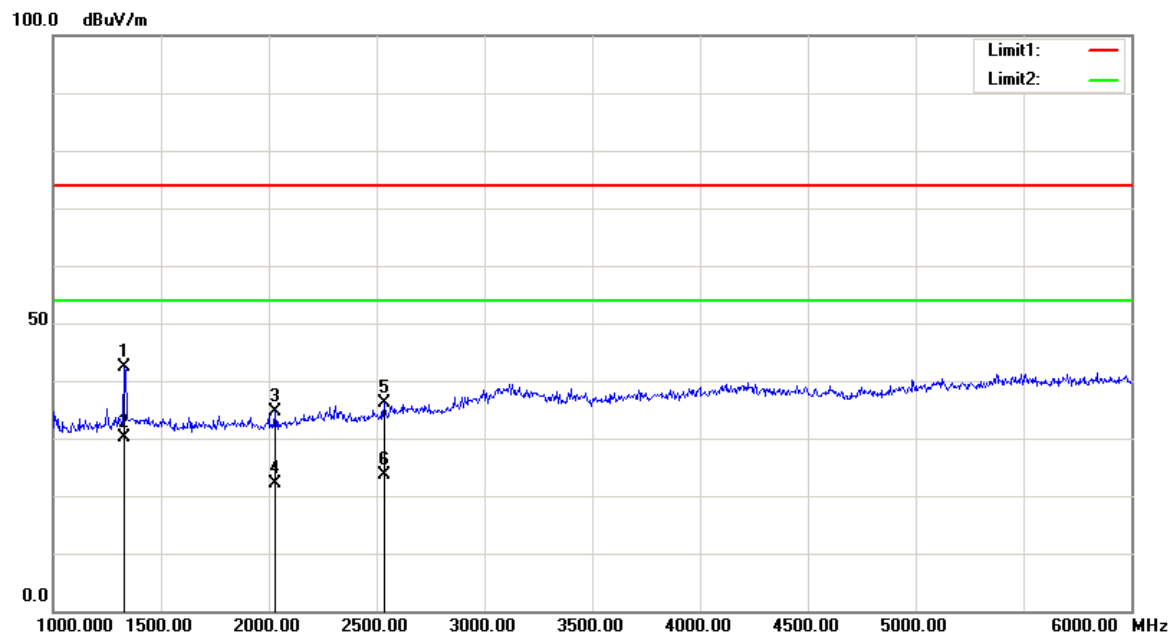
Vertical



Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
42.6100	40.83	QP	-8.63	32.20	40.00	7.80
81.4100	42.95	QP	-12.45	30.50	40.00	9.50
155.1300	30.25	QP	-7.45	22.80	43.50	20.70
191.9900	28.45	QP	-8.75	19.70	43.50	23.80
312.2700	28.27	QP	-5.67	22.60	46.00	23.40
625.5800	25.30	QP	0.10	25.40	46.00	20.60

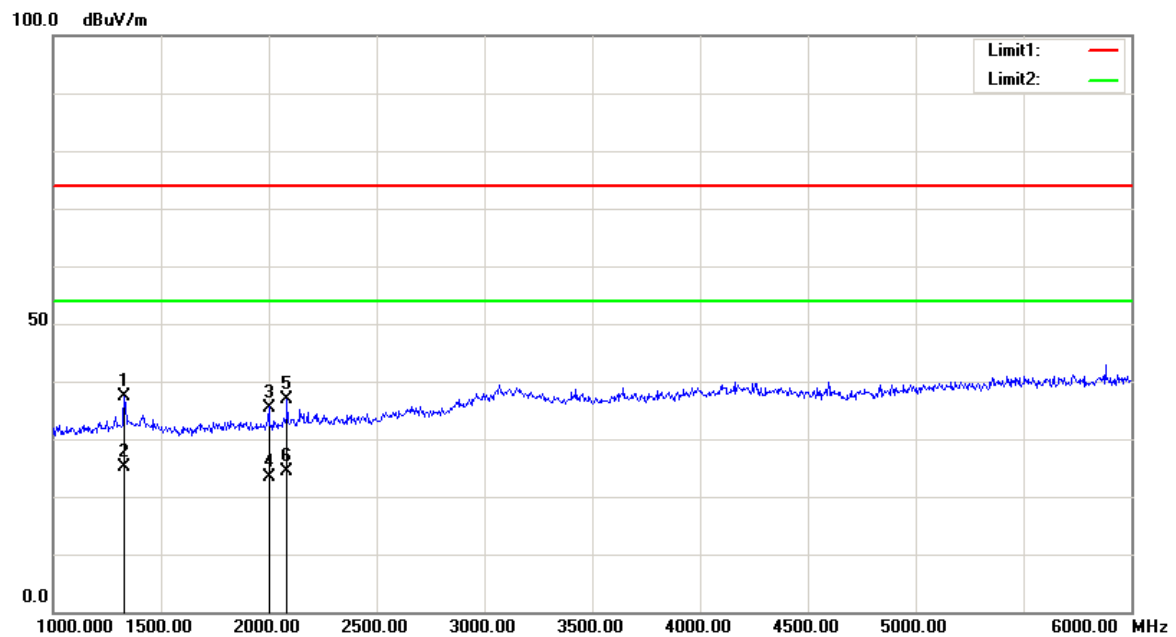
2) Above 1GHz:

Horizontal



Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1332.500	43.03	peak	-0.65	42.38	74.00	31.62
1332.500	30.79	AVG	-0.65	30.14	54.00	23.86
2030.000	34.06	peak	0.49	34.55	74.00	39.45
2030.000	21.74	AVG	0.49	22.23	54.00	31.77
2535.000	33.38	peak	2.70	36.08	74.00	37.92
2535.000	20.94	AVG	2.70	23.64	54.00	30.36

Note: For above 6 GHz, all radiated emissions are more than 20 dB below the limit or are on the system noise floor level.

Vertical

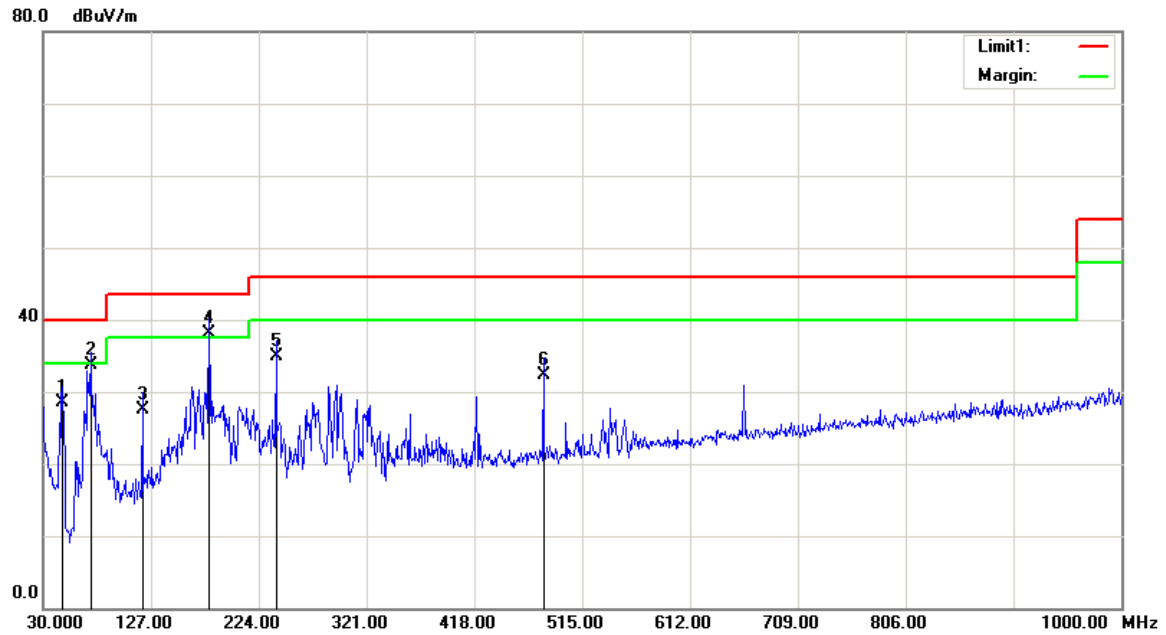
Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1332.500	38.12	peak	-0.65	37.47	74.00	36.53
1332.500	25.77	AVG	-0.65	25.12	54.00	28.88
2000.000	35.24	peak	0.26	35.50	74.00	38.50
2000.000	23.03	AVG	0.26	23.29	54.00	30.71
2085.000	36.07	peak	0.71	36.78	74.00	37.22
2085.000	23.75	AVG	0.71	24.46	54.00	29.54

Note: For above 6 GHz, all radiated emissions are more than 20 dB below the limit or are on the system noise floor level.

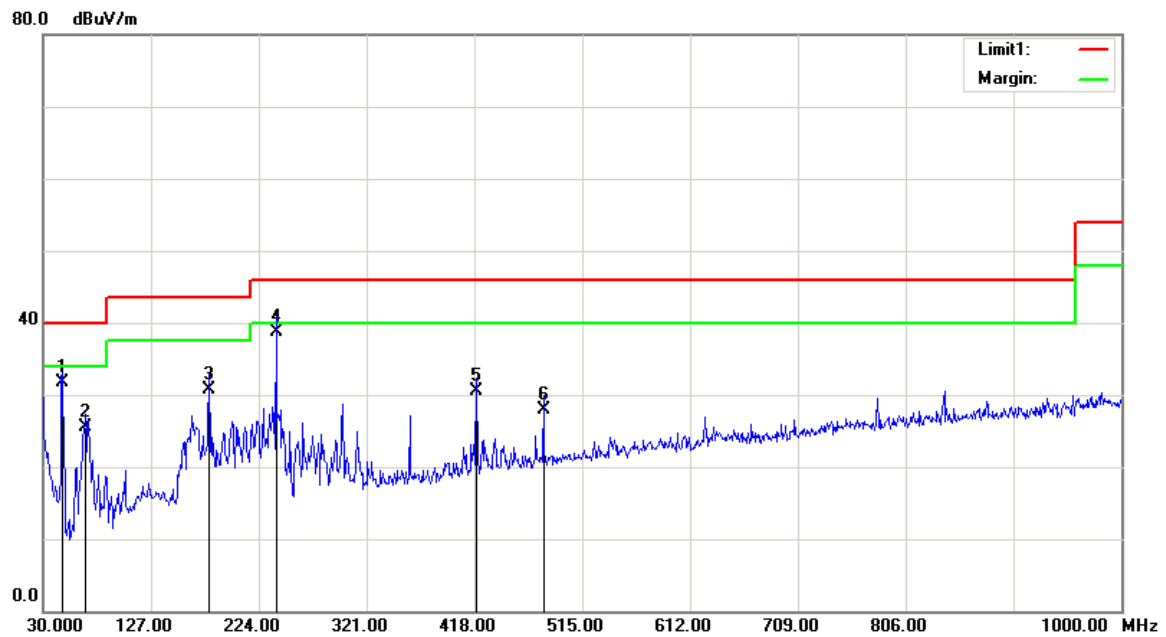
Test Mode 2: Playing audio & video file in U-disk

1) Below 1GHz:

Horizontal



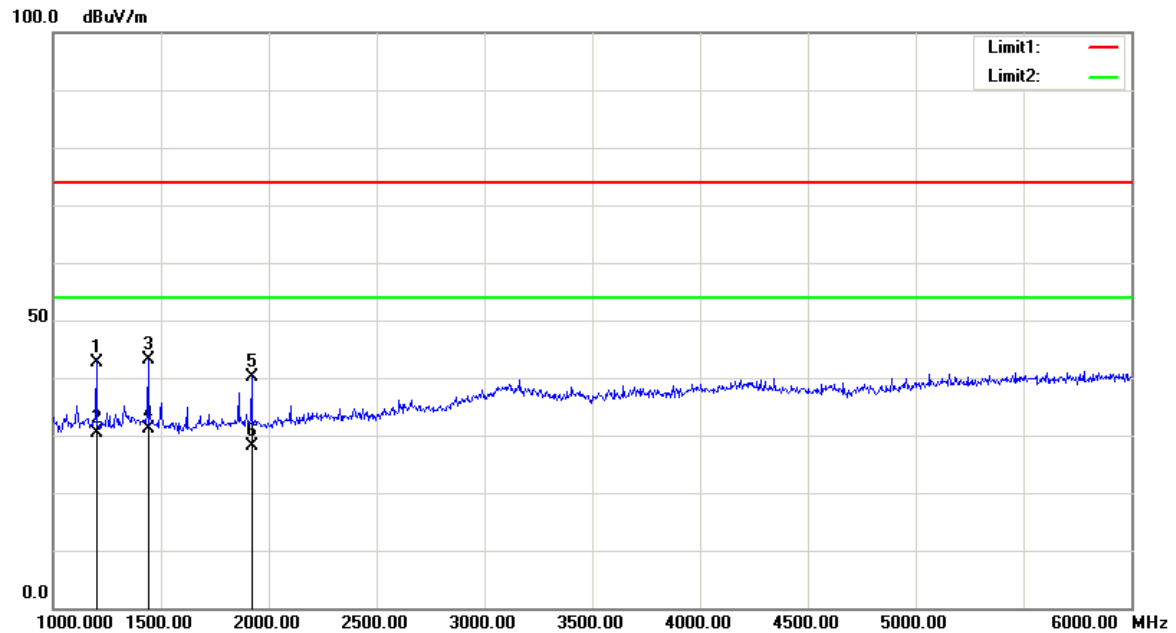
Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.4600	39.39	QP	-10.79	28.60	40.00	11.40
72.6800	45.51	QP	-11.81	33.70	40.00	6.30
119.2400	33.50	QP	-6.00	27.50	43.50	16.00
179.3800	46.58	QP	-8.48	38.10	43.50	5.40
239.5200	42.31	QP	-7.41	34.90	46.00	11.10
480.0800	33.56	QP	-1.26	32.30	46.00	13.70

Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.4600	42.59	QP	-10.79	31.80	40.00	8.20
67.8300	37.53	QP	-12.03	25.50	40.00	14.50
179.3800	39.28	QP	-8.48	30.80	43.50	12.70
239.5200	46.11	QP	-7.41	38.70	46.00	7.30
419.9400	33.12	QP	-2.62	30.50	46.00	15.50
480.0800	29.16	QP	-1.26	27.90	46.00	18.10

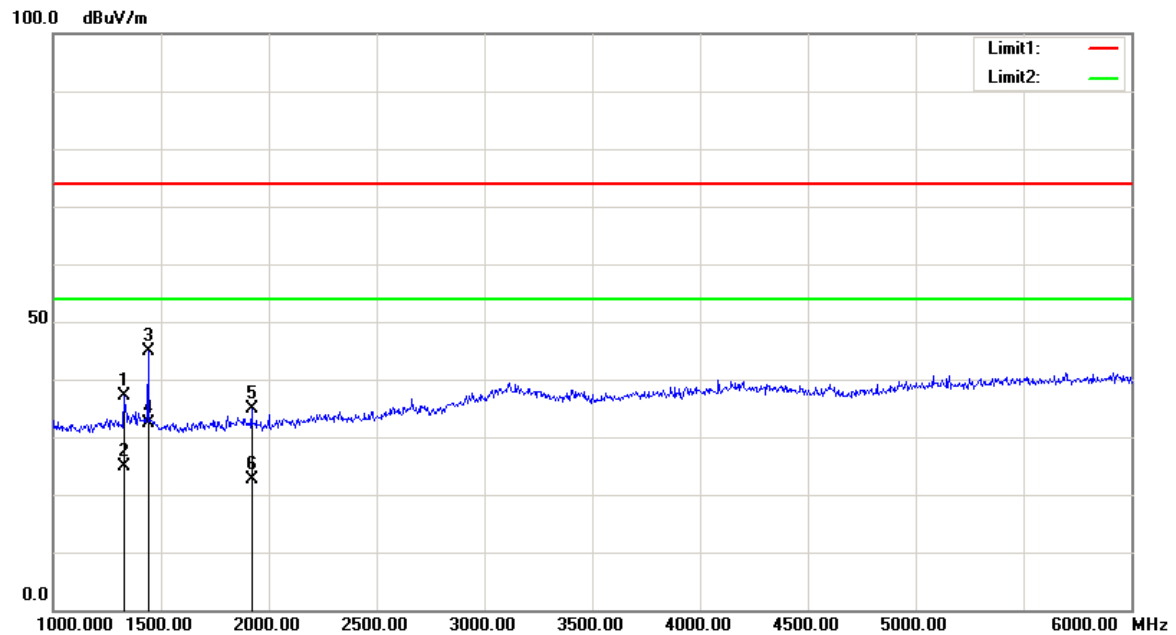
2) Above 1GHz:

Horizontal



Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1200.000	43.91	peak	-1.16	42.75	74.00	31.25
1200.000	31.57	AVG	-1.16	30.41	54.00	23.59
1440.000	43.96	peak	-0.76	43.20	74.00	30.80
1440.000	31.77	AVG	-0.76	31.01	54.00	22.99
1920.000	40.27	peak	-0.04	40.23	74.00	33.77
1920.000	28.13	AVG	-0.04	28.09	54.00	25.91

Note: For above 6 GHz, all radiated emissions are more than 20 dB below the limit or are on the system noise floor level.

Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/AVG)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1332.500	37.72	peak	-0.65	37.07	74.00	36.93
1332.500	25.54	AVG	-0.65	24.89	54.00	29.11
1440.000	45.64	peak	-0.76	44.88	74.00	29.12
1440.000	33.21	AVG	-0.76	32.45	54.00	21.55
1920.000	34.98	peak	-0.04	34.94	74.00	39.06
1920.000	22.65	AVG	-0.04	22.61	54.00	31.39

Note: For above 6 GHz, all radiated emissions are more than 20 dB below the limit or are on the system noise floor level.

DECLARATION LETTER

Hena Digital Technology (Shenzhen) Co., Ltd.

Add: 3F, South Tower, Jiuzhou Electric Building, Southern No, 12Rd, High-tech
Industrial Park, Nanshan District, Shenzhen, China

Tel: (86)755-82877246 Fax: (86)755-82879070

DECLARATION OF SIMILARITY

2015-11-2

To: Bay Area Compliance Laboratories Corp.(Dongguan)

No.69 Pulong Village puxinhu Industry Zone Tangxia

Dongguan, China

<http://www.baclcorp.com>

Dear Sir or Madam:

We, Hena Digital Technology (Shenzhen) Co., Ltd. , hereby declare that testing model
product: MID, Model number: MI90Q5. Multiple Models: MID90Q5, MI90Q5L,
MID90Q5L, MI90Q5S, MID90Q5S, MI90Q5*, MID90Q5*(* can be A-Z),
PAD943iW, PAD941iW. Multiple Model have the same appearance, structure, PCB,
Material and function to the testing product's model, and only are different for model
name.

Besides the differences in the above, we declare the products are identical. We
guarantee all the information provided above is true, and notice that we'll bear all the
consequences caused by any false information or concealing.

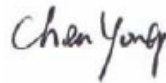
Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature

Chen Yong

Manager



******* END OF REPORT *******